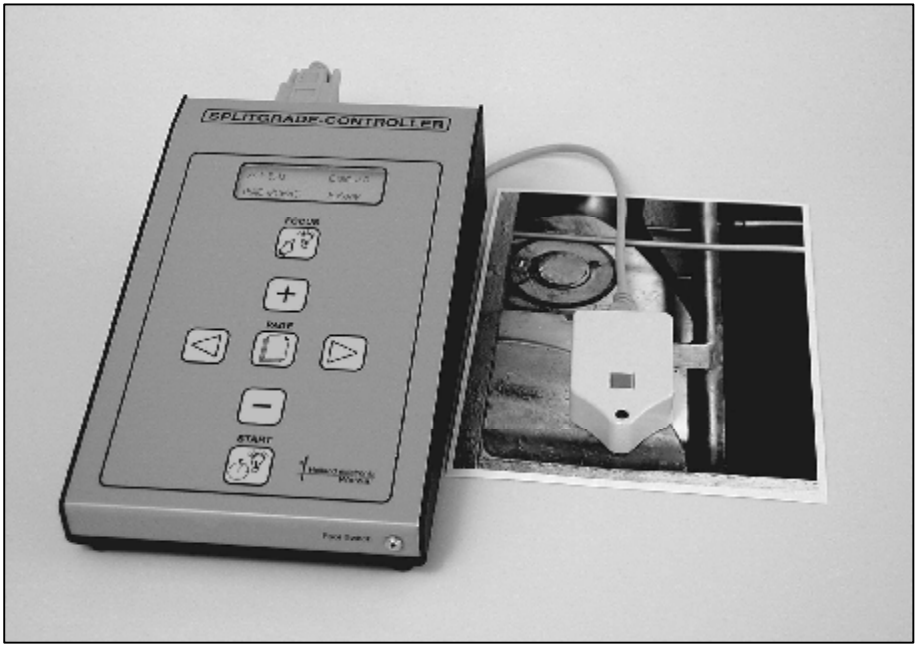
Heiland electronic GmbH

SPLITGRADE

Paper Gradation Management System

User manual V3.0



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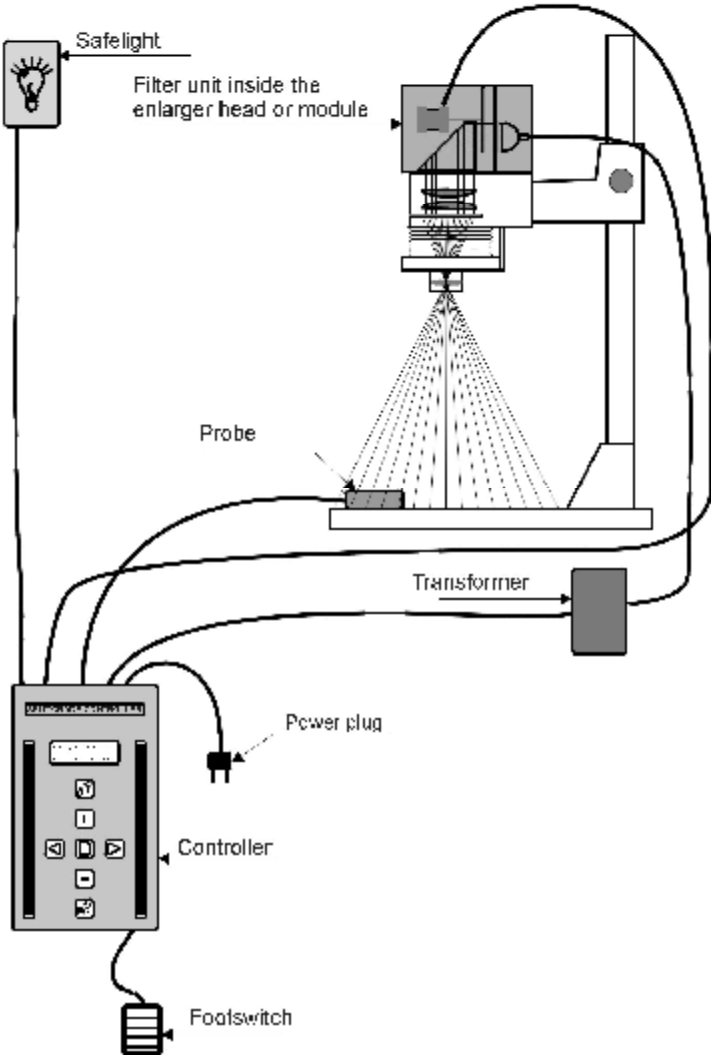
Schematic view of the complete SPLITGRADE System



The product

Copyright

All programs stored in the controller as well as this manual are protected by copyright. The copyright belongs to Heiland electronic GmbH, Wetzlar, Germany with all rights reserved.
Under the copyright laws no part of the programs and no parts of this manual may be reproduced in any form without the prior written permission of Heiland electronic GmbH, Wetzlar, Germany.

Warranty

This instrument carries the manufacturer's warranty for the period of two years from the date of purchase. Proof of purchase is the invoice or receipt. Damage caused by improper handling or unauthorised access invalidates the guarantee. No warranty either expressed or implied is made of this instrument regarding its quality, performance, suitability or fitness for a particular purpose.
The manufacturer is not liable for direct, indirect, special, incidental or consequential damages arising of the use or inability to use this instrument or documentation even if advised of the possibility of such damages. In particular the manufacturer assumes no liability for any material including negatives or photographs used with this instrument including whatever costs of repairing, replacing or recovering such materials.
This instrument has been carefully manufactured and tested using flawless materials and state-of-the-art technology. In case of failure return the instrument to an authorised service agent accompanied by proof of purchase. Within the warranty period, the manufacturer assumes the cost of replacement parts and repair. The manufacturer reserves the right to replace the instrument in lieu of repairing at its discretion.

Valid for software rev. 3.0

May, 3rd 2013, Changes without notice.

Technical Specifications of the control unit

Measuring probe	probe for exposure and gradation reading automatic setting of filter module and operating panel, acoustic support by beeper and LED, diameter of reading point: ø3mm
Exposure control	built-in exposure timer and light shutter
Measuring range	0.01- 10 lx (10 f-stops)
Exposure time range	0.5 - 500 sec,
Resolution	0.01 sec
Time error	<0.5%, repeatability error <0.1%
Gradation input	automatic in 0.1 steps, after reading of the contrast
Manual input	
gradation	in 0.1 steps with automatic density control
time	in1/10f-stops or 0.1 sec steps with constant grade
Grad tables	factory adjusted for up to 28 papers (main brands: AGFA, AMALOCO, FORTE, ILFORD, KODAK,KENTMERE, MOERSCH, ORIENTAL, TETENAL ...) and 6 films, updates by floppy disk or internet download via PC
Interfaces	reading probe, foot switch, RS232, USB
Display	illuminated LCD display with 4 lines
Voltage supply	230 V/50Hz or 110 V/60 Hz (see ID Label)
Dimensions (WxLxH)	160mm x 260mm x 80mm (Version 1...3) 120mm x 210mm x 70mm (Version 4)
Weight	approx. 1kg without accessories
Delivery content	controller, probe, footswitch, connecting cables, optional filter module or LED light source
Fuse	4A time lag

Factory calibrated paper types

Paper type	Display	Developer	Dilution/Time
ADOX MCP 310 RC	AD MCP310	MOERSCH Eco	1+9 / 75 s
ADOX Variotone FB	AD VARIOT	MOERSCH Eco	1+14/180 s
ADOX MCC FB	AD MCC	MOERSCH Eco	1+14/150 s
FOMA Variant III RC	FM III RC	CALBE N113	1+0 / 60 s
FOMA Variant 311 RC	FM V311RC	MOERSCH SE4	1+9 / 60 s
FOMABROM Variant 111 FB	FM B111FB	CALBE N113	1+0 / 120 s
FOMATONE MG Classic 131 FB	FM C131FB	CALBE N113	1+0 / 120 s
ILFORD Multigrade IV RC	IL MGIVRC	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade RC Warmtone	IL MGRCWT	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade RC Cooltone	IL MGRCCT	ILFORD Multigrade	1+9 / 60 s
ILFORD Multigrade IV FB	IL MGIVFB	ILFORD Multigrade	1+9 / 120 s
ILFORD Multigrade Art 300	IL ART300	MOERSCH Eco	1+14/180 s
ILFORD Multigrade FB Warmtone	IL MGFBWT	ILFORD Multigrade	1+9 / 120 s
KENTMERE VC Select	KE SE RC	KE VC Select Plus	1+9 / 100 s
KENTMERE Fineprint VC FB (2012)	KE FP FB	KE VC Select Plus	1+9 / 100 s
ROLLEI Vintage 311 RC	RO VIN311	MOERSCH SE4	1+9 / 60 s
TETENAL Vario RC	TT VariRC	MOERSCH Eco	1+14 / 60 s
TETENAL Baryt Vario FB	TT BA VA	MOERSCH Eco	1+14 / 90 s
TETENAL Work * use setting AGFA MCP RC			
Other papers**	Others		
Paper of fixed gradation***	Fixed (Exposure with white light)		

Further calibration sets for papers which are no longer under production may be installed while doing a software upgrade. This refers to brands of AGFA, AMALOCO, BERGGER, FORTE, FOTO IMPEX, MOERSCH, ORIENTAL, TETENAL, ZONE VI.

* These papers have not been calibrated, but the mentioned settings may be used with good results. That does not mean that papers are identical.
** Three channels may be used to adapt other papers. Factory setting is made for low, normal and high sensitive paper. Calibration is done with general corrections (see page 21)
*** Exposure with white light, time and grade measurement is possible. There is no certain paper defined, the user adapts his favoured paper by offset values to the Splitgrade setting.

Please note: All factory settings assume fresh chemistry and paper and 20° Celsius bath temperature !

Factory calibrated film types

Film type	**Display***
Conventional Silver halide film	Conv.
ILFORD „XP2“ *	XP 2
ILFORD „XP2 Super“ *	XP2 S
KODAK „T400CN“ *	T400C
KODAK „Portra“ *	Portr
KONICA „VX400“ *	VX400
Silver halide film developed with Moersch Finol **	Finol
Silver halide film developed with Moersch Tanol **	Tanol
Silver halide film developed with Pyrogallol **	Pyro.

Notes:

* When a chromogenic B&W film is selected, an additional symbol will be displayed for the film speed selected during the exposure:
  “+” for 50 - 100 ASA
  “N” for 200 - 400 ASA
  “-“ for 800 - 1000 ASA

** If you use developers giving a stain to the film, you may add additional offsets to compensate the stain. This is done independent of the paper offset values. For details please refer to page 21.

Contents of the delivery

If any of the following items are missing or damaged, please contact your supplier immediately.

- The controller, which interprets the measured values, translates them into the appropriate paper grade and exposure time and controls the filter wheel
- The probe, which scans the projected picture and transmits the values to the controller
- A footswitch to start or stop the exposure
- Cable set to connect the controller, enlarger and darkroom safe light
- Optional: An enlarger module with the motor-driven filter wheel or a complete light source with a power supply.

Note: we recommend to keep the packaging of the instrument in case of the need for further shipment.

Features

SPLITGRADE is an electronic instrument intended to control the exposures and the contrast range of variable contrast papers (VC) during enlarging.

- By printing the picture in two steps using maximum filter setting for yellow and magenta, print results are greatly improved.
- The contrast range of variable contrast papers will be perfectly matched to the given contrast range of the negative.
- The characteristics of various variable contrast papers from AGFA, AMALOCO, BERGGER, FORTE, FOMA, ILFORD, KENTMERE, KODAK, MOERSCH,TETENAL and ORIENTAL are already stored in the SPLITGRADE controller unit or could be added to the basic calibration set.
- The composition and evaluation of the picture takes place under white light.
- The exposure time and the grade are calculated after a scan of the projected negative. The scan is supported by acoustic and optical signals. The darkest and the brightest spot detected determine the result.
- The exposure time and paper grade are automatically adapted, also if another paper type is selected after measurement.
- At any time the usr might override the calculated values or just set the exposure time and paper grade without using the probe.
- Without an automatic filter module or light source, SPLITGRADE can be used as a high quality B&W analyser and exposure meter.
- The focus light will be automatically switched OFF after 5 minutes.
- The firmware is easily updated by a free download from our homepage. To do so, you need a PC with Windows, OS X or Linux operating system. If you own an older controller (serial no. starts with 02... or 03... you will need an additional USB-Serial converter to connect the serial interface of the controller to an USB port of the computer.
- SPLITGRADE is the comprehension of our practical experience acquired for more than 25 years

Conclusion

The usage of the SPLITGRADE system enables the production of high quality prints and fine art prints, with a speed and comfort never reached before by any other system.

As this printing system greatly improves printing efficiency, while saving time, chemistry and paper, every photographer will have much more time for creative printing.

Operation conditions

Safety advice

This instruction manual should be read prior to installation and first use.
The SPLITGRADE controller and module contained in this package are intended to operate only with the appropriate enlarger. The type of enlarger is specified on the front label of the package.
To prevent electric shock or fire hazard, remove the power cord from the AC supply prior to connecting or disconnecting any signal lead or prior to replacing the fuse.
If one of the AC cables becomes damaged, refer servicing only to qualified personnel.
Should any liquid drop into the SPLITGRADE controller or modules, disconnect immediate the control unit from mains and have it checked by qualified personnel before operating it again.
Unplug the SPLITGRADE controller from the voltage supply, if it is not going to be used for several days or more. To disconnect the supply cable, pull it by the plug. Never pull the cord itself, otherwise the cable will be damaged.
Make sure that the mains voltage and frequency are in the range indicated on the identification label on the bottom of the instrument.
This instrument should only be connected to a properly installed voltage supply outlet that has been properly grounded to earth.
It is not permitted to exchange the power cables for any other without protected ground / earth wire and safety plug.
Always keep the instrument in a dry place and never immerse it in any kind of liquid.
To prevent electric shock do not open. There are no user-serviceable parts inside.
To avoid fire hazard, use only a fuse of the correct type, voltage and current rating as specified in technical data (see page 6).

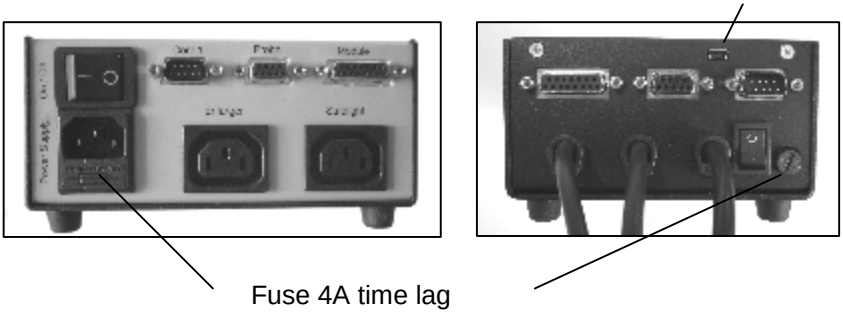
Installing the filter module and controller

All filter modules or enlarger heads, supplied together with SPLITGRADE, are compatible to those of the enlarger manufacturer. Please refer to the user manual of the enlarger regarding the installation of the module or head.
Do not install the set in a hot or humid place or in a place subject to excessive dust. Take care that there is enough working space around the controller to operate it safely in the dark.

Connecting the system

Fig. 2: Rear view of the SPLITGRADE Controller unit

Version 1...3 Version 4 USB



The controller can be used at voltages according to the id label located at the bottom of the unit.
All connectors, the main switch and fuse are located at the rear side connector panel (see Fig. 2).

First, connect all components to the controller like filter module or filter head, the enlarger and the darkroom safelight. Secure the signal cables by fastening the screws carefully. Please do not apply brute force.
Finally connect the SPLITGRADE Controller to the main voltage supply.
If a motorised filter module is connected, the filters will be moved to an initial position after switching ON. The rotation of the motor may be audible.

Component	**Cable/Plug**	**Label at Controller**
Filter module	15-pin female	Module
Probe	9-pin female	Probe
Splitgrade Comfort	9-pin male	Com 1
Power plug of enlarger	Adapter cable	Enlarger
Darkroom safelight	Adapter cable	Safelight
Main Voltage Supply	Power cable	Power Supply
Foot switch	Jack plug 2.5mm	Foot Switch
PC (only for software update)	9-pin male (Ver 1..3) USB (Ver. 4)	Com 1

Table 1: Connections

Using the controller

Description of the push-buttons and the display

The functions are controlled by push-buttons, the buttons marked by ***** have an auto repeat function.
One short press changes the value in one step, a longer press will result in a repeated change of the value.

Focus, ON/OFF switches the enlarger light on/off,
for setting the enlarger and scanning the picture with the probe.

Start/Stop, starts (or stops) the exposure time shown in the display.

The remaining time is still stored and can be recalled by pressing the start button again. If during exposure any button other than the start button is pressed, the exposure will stop and the time will be cancelled. Splitgrade controllers of the first generation are using the upper symbol, those of the second generation the second symbol.

Plus,* increases the value marked by the cursor in one step, or changes the function.

Minus,* reduces the value marked by the cursor in one step, or changes the function.

Cursor, moves the cursor in the direction of the arrow or to the next line.

Page, switches between the pages of the LCD display.

Foot switch, starts (or stop) the exposure.
Probe switch, starts and stops the density measurement

Display

All data important for the working of the system are shown in the 4-lines display. The contrast can be regulated by turning a screw (potentiometer), which is accessible through a tiny hole at the left rear side of the controller.

THE QUICK PATH TO HIGH QUALITY PRINTS

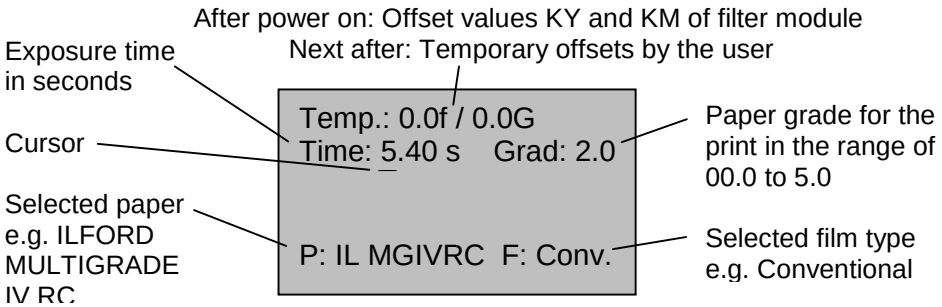
In order to profit from the SPLITGRADE system very quickly you should proceed as follows:

Preparation

- Connect the controller following the safety advice on page 10.
- Use a paper and matching chemistry as indicated on page 7 of this manual using only fresh paper and chemistry.
- Do not use old paper or used chemistry.
- Switch the controller ON.
  If the filter module and the probe are connected properly, the controller displays the following information for a short while:

  1.Software release
  2.Type of enlarger

The display will look similar like that:


After power on: Offset values KY and KM of filter module
Next after: Temporary offsets by the user
Exposure time in seconds
Cursor
Selected paper e.g. ILFORD MULTIGRADE IV RC
Temp.: 0.0f / 0.0G
Time: 5.40 s Grad: 2.0
P: IL MGIVRC F: Conv.
Paper grade for the print in the range of 00.0 to 5.0
Selected film type e.g. Conventional

- If you like to change the paper type, move the cursor to P: by pressing the ◁ ▷ or button.

- Start the selection of the paper type by pressing the + − or

  button. Each time you press the button, another paper brand will appear. Continue pressing or simply hold the “+” or “-“ button until your preferred paper is displayed. Accept the selection by pressing the ⧉ button.

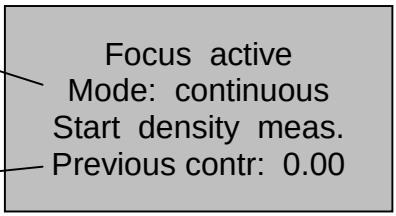
- If necessary, move the displayed cursor to “F”: in the display and change the type of film the same way.

Printing

- Put the negative in the negative carrier.
- Switch on focus light by pressing the button
- The following display appears:

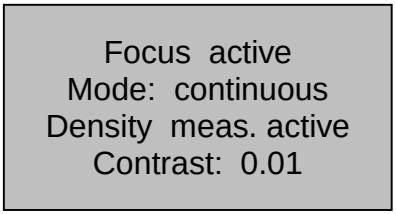
Indicates the selected measurement mode (refer to page 20)

The contrast of the previous measured negative



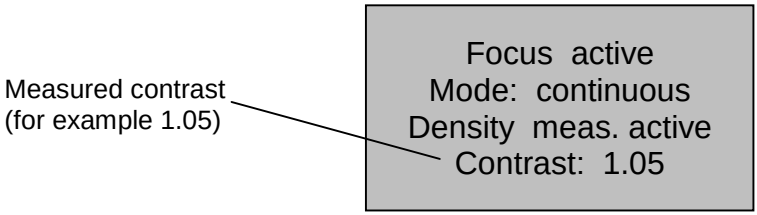
- Set up the magnification and focus the image. Then stop down the f-stop of the enlarger lens.
  Measurement is always done at working f-stop.

- Put the probe into any part of the projected image, taking care that the green window on top of the photo sensor is not covered.
- Start the measuring procedure by briefly pressing the red button on the probe, An intermittent signal sounds and you will have the following display:



- Move the probe over the projected image while looking for the darkest and the brightest areas until the signal stops. Maximum probe movement velocity is 5cm/sec, which is similar to the movement of a computer mouse. The displayed contrast will increase.
  We recommend **not** to measure very small spots like lamps and candle lights, as their contribution is not important for the overall impression of the print but can falsify the measurement resulting in a too soft grade.

When the sound stops for a longer time, you might stop the measuring procedure by pressing the red button again. You will get a display similar like that:



- Switch OFF the enlarger light by pressing the button .
  The display shows the exposure time and the paper grade as calculated by the controller for the selected paper and film type.
  If the beeper sound 3 times, please check the display and refer to the detailed description in section "Error messages" on next page.

- After a successful measurement put the paper on the enlarging easel and start the exposure by pressing the button.

- Process the paper.

Result

The lightest and darkest portions of the negative, which have been measured, result in about 90% of the max. density and a light grey print tone. This is what we call a technical correct print. It will satisfy your requirements for a good start in most cases.

If you wish to change the print, please refer to the chapter “Manual change of the grade” on next page.

Error messages

Failures during or after measuring will be announced by a 3 beep signal and displayed as follows:

Too much light Start meas. again	Too much light, close the f-stop and start measuring again
Too little light Start meas. again	Too little light, open the f-stop and start measuring again
Time too long Start meas. again	Exposure time is too long, open the f-stop and start measuring again
Time too short Start meas. again	Exposure time is too short, close the f-stop and start measuring again
Check contrast	The measured contrast is out of the ISO-R range of the selected paper. If you proceed, you may loose details, because the paper grade could not get less 00 or more than 5.

Another reason might be, that you covered the photo sensor or you moved it outside the negative (e.g. to the base plus fog area) while measuring. This results also in a large contrast.

MANUAL CHANGES

Changing the grade

If, after developing the print, you have the impression that the print should be a little harder or softer, move the cursor in the display to the position Grad: and change the grade in steps of 1/10 grade with the buttons or .

The exposure time will be adjusted automatically to achieve constant lights, mid grey or shadows – what ever you set in the user preferences..
These changes are displayed in line 1 of the LCD and are valid until a new measurement is started. You might return at any time to the original values.

Changing the exposure time

If the print should be darker or lighter, move the cursor to position Time: and change the exposure time according to your needs with the buttons or

Factory setting affects changes in steps of 1/10 f-stop, re calculating the exposure time considering the reciprocity failure.
At any time you might change that default setting to a linear change in units of seconds.
These changes are also temporary and are displayed in the first line of the LCD. A new measurement override the changes.

Adjustments in special cases

Portraits
If there is a lack of black and white tones in the negative, please change the measured grade to a grade of about 2 manually. You might use the zone scale of the comfort unit to adapt the exposure time. To do so switch on focus light again and press the knob "Start" on the comfort unit. Place the probe into an area representing skin tone and adjust the exposre time until the mid LED of the zone scale is in the correct position.

White egg on white plate
In this case the contrast is very low and Splitgrade tries to compensate the low contrast with a too hard grade. Also the exposure time will be too long. Solve this problem by altering these values in the opposite direction.

Black dog on black coal
In this case the contrast is also very low. Like in the previous example, a softer grade has to be selected. The exposure time need no adjustment.

Same tone range for different enlargement scales
If you like to get the same tonal range for pictures of different magnification, you should always select the same points while measuring.
If you like to clip a part of the negative and the darkest and the brightest points are not situated in the area to be printed, please measure thes points also to secure correct reference values for calculation of the paper grade and the exposure time.

Burning in with pure Yellow or Magenta

If the cursor is in Position Grad: then you may fast change the paper grade to 00.0 by pressing simultaneously the buttons and

A value of 5.0 is selected by pressing simultaneously and

Depending on the selected paper, the light for grade 00.0 may contain a small amount of Magenta. This is not an error, it is needed for reaching the max. density of the paper.

USER PREFERENCES

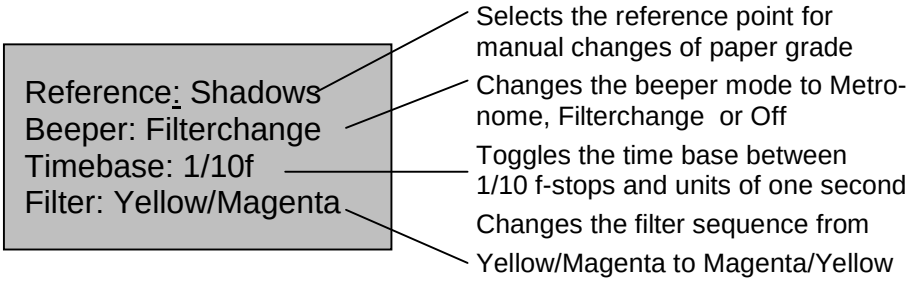
Controller-specific settings

Changing the factory set values

Change the settings of the controller according to your needs. Every change will be stored, even after switching OFF the power, until you change these values again.

Press the button to get the following display :

or moves the cursor to a different line, or changes the setting


Reference: Shadows
Beeper: Filterchange
Timebase: 1/10f
Filter: Yellow/Magenta
Selects the reference point for manual changes of paper grade
Changes the beeper mode to Metro-nome, Filterchange or Off
Toggles the time base between 1/10 f-stops and units of one second
Changes the filter sequence from Yellow/Magenta to Magenta/Yellow

Details of the functions

Reference point:

Before changing the paper grade manually, you might determine which tonal value should stay unchanged.

Shadows:	The shadows will stay constant at about 90% Dmax (default)
M*id grey:*	The mid grey value (approx. zone V) will stay constant
Lights:	The light portions of the print will be unchanged

Beeper:

Metronome:	Every second a short signal is produced while the exposure time is elapsing.
Filterchange:	1 sec. before the filter changes a long signal is produced.
Off:	No signal during the exposure time

Time base:

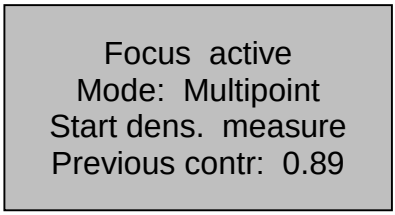
Toggles the time base between 1/10 f-stops and units of one second. The advantage of 1/10 f-stop is that changes are easier to evaluate when you are thinking in density values. Moreover, changes are faster if the exposure time is long. Changing the time in units of a second adapts the step size dynamic to the exposure time and uses step sizes of 0.01 / 0.1 / 1 seconds, depending on the absolute exposure time. A quick change of exposure time is possible, by pressing and holding the **+** or **–** button. This mode is provided for photographers, who do not like to work with 1/10 f-stops.

Filter:

To change the sequence of filtration. This is very helpful when you want to burn-in or dodge the print .To change for example some areas in the picture during the exposure with Yellow light, it is advisable to choose the sequence Magenta/Yellow. You thus can locate the area during the Magenta exposure phase in order to manipulate this area immediately after the filter change.

Measurement mode / Density measurement

A second mode may be implemented for measuring only selected parts of the negative. To activate this mode switch on the Focus light, then press the button [+] to get a display like this:



First place the probe at the lightest point of the negative with details in, then press the red button of the probe for about half a second. The 3rd line displays now the density in reference to this first point, the last line displays the contrast that is taken into later calculation. To check the density of other areas in the negative simply move the probe to this point. To add the selected point to the later calculation, press the red button of the probe for a short while. You may also measure the whole negative while moving the probe and simultaneously pressing and holding down the red button.
To calculate the exposure, release the red button and press again.

General corrections of exposure time and paper grade

Press the button until you get the following display:

Offset Time:	+0.0 f
Offset Grad:	+0.0
Comp. Stain:	+0.0 f
Comp. Stain	+0.0G

Please note, that line 3 and 4 are displayed only when a film developer causing stain is selected in the main menu

Exposure time
If, due to changes in the paper emulsion, your darkroom conditions, the kind of images or your perception of your prints are generally looking too bright or too dark, you may compensate this by adapting the exposure time. Press the or button until the cursor is at position: **Offset Time**.
Press the button or to change the exposure time in 1/10 f-stops. For special applications like “Lith printing” the range of exposure time offset is +/- 4 f-stops. The setting for the grade is not affected by these changes.

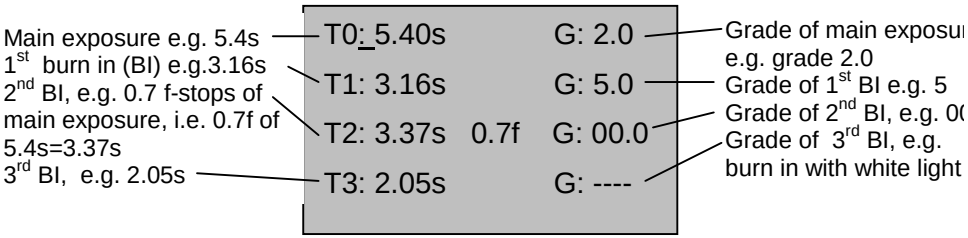
Paper grade
If your prints are generally too hard or too soft, you should change the grade setting.
Press the or the button until the cursor is at position: **Offset Grad.**
Using the or the button you can change the setting in 0.1 grade steps.

Films containing a stain
To compensate for the stain, you might increase the paper grade and the exposure time. Just not to mix up these offset values with the paper specific offsets, another two lines are displayed, when choosing 'Tanol', 'Finol' or 'Pyrogallol" developed films. The entered offset values are added to the paper specific offset values, e.g. the total exposure time is calculated by adding 'Offset Time' and 'Comp.Stain' to the measured exposure.

Please note:
- All offsets are stored, when you leave the menu by pressing
- For every paper separate offsets could be chosen. Resetting the values to factory calibration is done by selecting 0.0.
- By using these offsets, you can easily adapt Splitgrade to your personal requirements or to modified paper processing.

BURN-IN FUNCTION
Activation and Setting

Your SPLITGRADE has a very useful burn-in function. It enables you to store up to 7 independent burn-in times, building up an exposure sequence together with the main exposure time. The main exposure is automatically followed by the burn-in exposure. To enter the menu with the burn in functions press the key several times. If the controller is in the main menu, a short cut is to press the two keys and simultaneous.


Main exposure e.g. 5.4s
1st burn in (BI) e.g.3.16s
2nd BI, e.g. 0.7 f-stops of main exposure, i.e. 0.7f of 5.4s=3.37s
3rd BI, e.g. 2.05s
T0: 5.40s G: 2.0
T1: 3.16s G: 5.0
T2: 3.37s 0.7f G: 00.0
T3: 2.05s G: ----
Grade of main exposu
e.g. grade 2.0
Grade of 1st BI e.g. 5
Grade of 2nd BI, e.g. 0
Grade of 3rd BI, e.g.
burn in with white light

In line 1 (T0) the calculated (main) exposure time and grade are listed.
If you change these values, please pay attention to the fact that the time and grade in menu 1 are also altered accordingly.
Changing the time/grade in either line is done by pressing the or button until the cursor appears in the desired position. The display switches automatically between Times 0 to 3 and 4 to 7, while moving the cursor.

Altering the values of the time and grade is done by pressing or
By pressing these both keys simultaneous, you alter the mode of the burn in time, which is actually marked by the cursor. You decide if the time should be independent of the main exposure (in the above example T1 and T3) or should be adapted to the main exposure in case that the main exposure is altered (in the above example T2). This feature could be selected for any of the burn in times. The advantage of the f-stop method is, that after a change of the enlargement scale, you only have to measure the main exposure time again and the whole burn in sequence is adapted to this new time.

If you have entered all the times and grades for a special sequence, set the cursor to the first unused burn-in exposure time. Press and hold the button in order to change this time to 0.00s or 0.0f-stop. This signals the end of defining the exposure sequence to the controller.

Exposing

Example: You may like to use the main exposure and two additional burn-in times as well. The values T0 and G0 are the main exposure, values T1 / G1 are the first burn-in and T2 / G2 are the second burn-in time. Afterwards please set T3 to 0.00s.
Go back to time T0, by using or button. To start the exposure sequence press the button. . After any exposure is finished, the cursor moves on to the next line and the according burn-in time can be started by pressing again.

The whole sequence is terminated after the last programmed (maximum 7) exposure has been executed and the cursor moves back to time T0.
You may stop and continue an exposure by pressing the again,
or you can terminate the whole sequence at any time (also while exposing) by pressing any other button.
Between the single steps of the sequence you may turn in the red (safe light) filter in front of the lens and switch on the focus light in order to search for areas that should be dodged. The focus mode will not terminate the exposure/burn-in sequence.

All settings will be stored automatically when you leave the burn in menu.

Of course, you may also select only one of the burn in times and start this time by pressing the button.

To quit the burn-in function, press the key, the main menu is displayed.

Burn-in using white light

For any of the burn-in times 1-7, you may select white light for burn-in. To do so, change the paper grade to 5.0 and press one more time or select paper grade 00.0 and press
The display will then show "---" to indicate the while light mode.
To cancel this setting, simply select another paper grade.

TEST STRIP MODES

To print a test strip, enter the menu by pressing the button several times.

SPLITGRADE offers 3 different test strip modes for various purposes. One mode alters the paper grade, two others alter the time by using separate exposures or additive exposure times.

You may choose between centering the exposure around the preset values or just creating a test strip which is only lighter or only darker than the preset value.

Within every test strip mode you have the flexibility of setting the total number of test strips (parameter 'Count') as well as the step size or width.

Modes 'Time Separate'

Each exposure is done by the complete calculated time. This requiries the masking of all but the exposed step or to use single strips of paper. The paper grade is unchanged. Available modes are:

Time sep-: Test strip created from a light exposure up to the preset value
Time sep : Test strip centered to the preset value
Time sep+: Test strip starting at the preset value with increasing time

Mode 'Time Additive'

The first exposure illuminates the whole test strip, then the user places the mask and shifts it from left to the right for any subsequent exposure. The paper grade is fixed to the preset value. Available modes are:

Time add-: The most right area of the strip represent the preset exposure, all others are lighter
Time add : Test strip with the preset value in the center of the strip
Time add+: Test strip starting at the preset value with increasing time

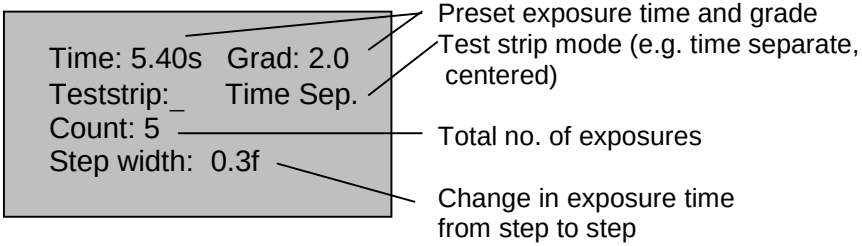
Mode 'Grade'

Each exposure will vary the contrast by the setting of "Step width" . This mode requires the masking of all but the exposed step or using single strips. The exposure adjusted according to the reference point set in user preferences. Available modes are:

Grad- : Test strip created by paper grades softer and equal to the preset grade
Grad : Test strip with the preset grade in the center of the strip
Grad+: Test strip starts at the preset value and increasing the grade with any subsequent exposure.

As in any other menu move the cursor by using the buttons
Alter the value that is indicated by the cursor with buttons.

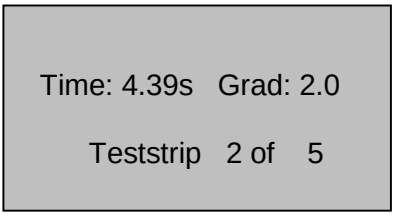
Example:


Time: 5.40s Grad: 2.0
Teststrip:_ Time Sep.
Count: 5
Step width: 0.3f
Preset exposure time and grade
Test strip mode (e.g. time separate, centered)
Total no. of exposures
Change in exposure time from step to step

After you have defined all necessary values, and press the button to start the first exposure.
The display will show the actual time and grade while exposing.

In the example five strips are generated with a paper grade of 2.0 and the following times: (first exposure) 3.56s / 4.39s / 5.40s / 6.65s / 8.18s (last exposure). Each exposure will be started after pressing the button .

While doing the various exposures, the controller display is similar to that:



Switching on the focus light with the button could be useful to check the position of the mask, of course with the red filter moved in front of the lens.

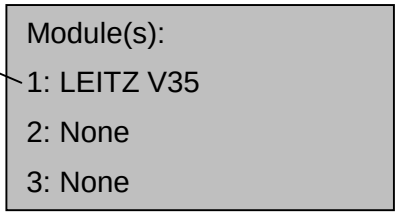
The whole exposure sequence of the test strip is cancelled by pressing any other button.

Controlling up to three different types of enlarger

You may use different types of enlargers / modules with only one controller. To set up and select the module type, please proceed as follows:

1) Switch off the controller and connect the new filter module.
2) Press and hold the button while switching on. Hold the button until the following display appears.

In the first line the original delivered module is displayed, e.g. Leitz V35.



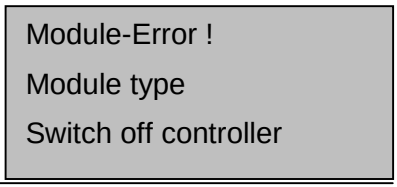
3) Move the cursor to one of the three lines by using buttons and select the module type with the buttons.

ATTENTION: The enlargers AGFA Varioscope, Leitz Ic and IIc use all Dunco Filtermodules, so please select “DUNCO” in this case.

4) By pressing the button you may toggle between the described menu and a menu, that enables to enter filter offset values for yellow (green) and magenta (blue) filters. If you have so far used values in % or you do not know the offset values, please contact Heiland electronic to receive the values in units of 1/10 f-stop. Further more you are able to enter a delay time which is defined from switching on the enlarger output until the shutter is opened. You may change this time, if you use a stabilised transformer which need more then 0.5 sec. until the lamp is switched on. Please note all settings on a sheet of paper.

5) Finally select the required enlarger or module type by moving the cursor in the corresponding line and press the button . In case of a module error, faulty module selection or a disconnected module, the controller displays

Check the module and switch on again while selecting the correct module type. If Splitgrade should be used as a timer only, select “None” .



Using the controller as a high quality analyser (SPL-M1)

The controller of the SPLITGRADE system can used as a B&W analyser and timer in conjunction with enlargers for which there is at present no motorised filter module. The version with order code SPL-M1 is already set to this manual split exposure mode.
Prior to working, the controller need to be calibrated in reference to your enlarger. An instruction for calibration may be requested at the manufacturer, in this case please mention the type of enlarger and light source. To use the manual split exposure, proceed as follows:

- Install and set up the controller according to the description on page 10.
- If you have not purchased the SPL-M1 version, follow the instruction on page 26 to set the enlarger type to 'Manual'.
- Select paper and film type.
- If using a colour or multigrade head on the enlarger, set to white light. Otherwise remove all filters from the light path.
- Switch the enlarger light ON by pressing the button
- Select the f-stop in order to achieve a exposure time of at least 5s. This will reduce the effect of lamp start-up and after-glow on the exposure
- Measure the exposure and grade as described on page 14
- Terminate the measurement by pressing the button again
- Press the button and select the displayed filter type. On the colour or multigrade head dial maximum magenta or yellow; otherwise insert grade 5 or grade 00 filter in the light path.
- Start the first exposure by pressing the button
- Remove the inserted filter or select filter position 0 and select the second filter as displayed in the controller display
- Start the second exposure by pressing the button again.
- The image has been exposed by using two different filter settings according to the split grade method.

CARE AND MAINTENANCE

CAUTION:

To prevent electric shock do not open the instrument. There are no user serviceable parts inside.

Note: Any unauthorised opening or servicing invalidates the guarantee.

Changing the fuse

The fuse is located in a fuse carrier on the rear side of the instrument (please refer to Fig. 2, Page 11 . To change the fuse, remove the main power supply connector and open the fuse carrier by using a small screwdriver.

!!! Use only fuses with a rating of 4A time lag!!!

Care of instrument

The case should be cleaned with a lightly dampened soft cloth or chamois only, if necessary with the addition of a mild cleaner.
Do not use solvents or abrasive materials.
The probe should be cleaned only with a soft brush or compressed air to remove dust, otherwise the incorporated sensor might be damaged permanently.
Unplug the instrument when not in use for long periods of time.
For necessary repairs send the instrument to the manufacturer or authorised service centre.

APPENDIX: DETAILS OF FILM AND PAPER PROGRAMS

The controller is factory-equipped with programs controlling the exposure time and grade for a given combination of variable contrast paper and negatives of a certain kind.
These programs may be adjusted from time to time according to the current characteristics of commercially available papers and films.

Program adjustment for films

Classic B&W films: The setting 'Conv.´ covers all conventional silver halide films as long as the film base does not show any peculiar colour, which could influence the measurement of the time and the grade.

Chromogenic B&W films: These films are modified colour films, processed in C41 chemistry mostly by professional labs.

Detailed tests show that despite the strictly standard C41 developing process, the tint of the film might differ. As these differences can imply non-predictable differences in exposure time and grade, the measured values can only be a clue which should be adjusted if necessary.

Another peculiarity of chromogenic film is its reaction to different exposures. In the same way as for silver halide films, the best results are obtained when the exposure is done with enough light. The reduction of the ASA setting by about a half or a quarter improves the details in the shadow areas of the print and yields finer grain.

The contrast of the negative changes with the exposure value: with increasing exposure the contrast becomes higher with the result that doubling or quadrupling the ASA value yields negatives which are hard to print.

For all these reasons the programs for chromogenic films are provided with a compensation for the different modes in which the film was exposed. They are collected in the group **”N”** for normally exposed film, **“+”** for longer and **“–“** for shorter exposures.

If you do not know the exposure mode for a given film, start with the adjustment **“N”**. If the result is too light try again with the **“+”** setting , if they are too dark, try it with the **“–“** setting. If you are not able to get satisfactory results, try to use the "General corrections” (see page 21).

Films containing a stain: Especially fine art printers appreciate the improved details in the highlight sections of a print effected by a stain in the film. That stain is caused by special developers like Pyrogallol, Tanol and Finol.
On the other hand, the photographer need to adjust the selected paper grade and exposure time to get acceptable print results. In most cases it is necessary to raise the paper grade by approx. +0.5 to +1.0 and to increase the exposure time by about half of an f-stop.
No exact values could be recommended here, but every photographer will know the approximate values for his process. These offsets could be entered separate from the basic paper specific settings if the users selects either 'Finol', Tanol' or 'Pyrogallol' as the film type. Of course we know, this is not a film type, but the selection of these special developers fit best in the section of film types. Please refer to page for details.

Paper programs:

The papers listed in the Table 1 are all with glossy surface and were developed in a tray, strictly following the recommendations of the manufacturers, including the kind of chemicals used and developing time. The prints were dried with hot air at 60°C.
Papers with a matt surface share the same emulsion as glossy papers. Never the less, you might add small offsets to adjust the appearance of the print according to the reduced max. density.

Note: The use of old materials, paper or developer, or varying the instructions of the manufacturers, may change the results you can expect.

Further products of Heiland electronic for your darkroom

High precision mono-chrome densitometer for all tasks in general B&W photography, microfilm-applications and repro companies.

TAS film processor

If you would like to receive further information about our products, please refer to our address, located on the back cover.

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